

A Retrospective Study of Traumatic Diaphragmatic Hernia in Rajasthan

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ABSTRACT

Introduction: Diaphragmatic injuries occur in 3.9 % of chest injuries. Traumatic diaphragmatic hernia usually undergo unrecognized. Diagnosis of diaphragmatic injuries is usually difficult. **Materials and Methods:** The records of patients who got operated for traumatic diaphragmatic hernia in the Department of Cardio- Thoracic and Vascular Surgery at SMS Hospital, Jaipur between July 2012 to July 2019 were referred. 39 patients underwent surgery for diaphragmatic hernia. From records history, age, sex, symptoms, signs, chest X-ray finding, operative approach for repair, operative course and outcome were recorded. **Results:** From 2012 July to 2019 July, 39 patients were operated by thoracotomy for traumatic diaphragmatic injury of which 29 were males and 10 were females. The oldest patient was 60 years old and the youngest was 12 years old. The cause of rupture of diaphragm was blunt abdominal trauma in 30 cases, penetrating chest trauma was seen in 9 cases. 33 cases gave history of road traffic accidents, 6 had fallen from height. Left sided tear was seen in 35 cases whereas 4 patients had right sided rupture. Most common symptom was difficulty in breathing seen in 34 cases. Reduced air entry was seen in 39 cases. The diagnosis of diaphragmatic hernia was made on the basis of history, clinical examination of chest X-ray with ryles tube *in situ* in 36 cases, whereas 3 case required CECT. **Conclusion:** Traumatic diaphragmatic hernia requires high index of suspicion for diagnosis, investigation most commonly chest x ray with ryles tube. It is more common in males and usually left sided. Early and prompt surgical repair by thoracotomy is the treatment of choice. **The following core competencies are addressed in this article:** Patient care and Procedural skills, Medical knowledge, and System-based practice.

Key words: Traumatic diaphragmatic hernia, Thoracotomy, Cardiothoracic surgery, Traumatic diaphragmatic rupture, Injuries, Traumatic, Diaphragmatic Hernia,

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INTRODUCTION

The prevalence of diaphragmatic injuries due to thoracoabdominal trauma ranges from 1.1 to 3.9%.¹ The diagnosis of diaphragmatic hernia is still a challenge for a cardiothoracic surgeon.² This injury is clinically masked by other associated injuries. Male preponderance is generally seen in diaphragmatic hernia.^{3,4}

Trauma to thoracoabdominal region is the cause of Traumatic Diaphragmatic Hernia (TDH). Traumatic thoracoabdominal injuries often lead to haemodynamic instability, respiratory distress, gastrointestinal symptoms and even cardiac arrest which might be one of the plausible reason of delayed diagnosis of TDH.⁵ Incidence of TDH is more frequently caused by penetrating injuries than blunt trauma.⁶ Multidetector CT (MDCT) has been mentioned as the reference standard for the diagnosis of diaphragmatic injury.

MATERIALS AND METHODS

The records of patients who got operated for traumatic diaphragmatic hernia in the Department Cardio-Thoracic and Vascular Surgery at SMS Hospital,

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Jaipur between July 2012 to July 2019 were referred. 39 patients underwent surgery for diaphragmatic hernia. From records, history, age, sex, symptoms, signs, chest X-ray finding, operative approach for repair, operative course and outcome were recorded.

RESULTS

In our study males (74.35%) outnumbered females (25.64%). Mean age of study population was 42.66 ± 37 . 89.74% of left sided TDR were reported while 10.25% cases were of right sided TDR. In 76.92% of patients the etiology was blunt trauma to abdomen while in 23.07% of cases it was due to penetrating injury. In our study the major cause of blunt trauma was road traffic accidents as seen in followed by a history of fall from height. Most of the patients came with the history of difficulty in breathing and chest pain. Some patients gave history of abdominal symptoms. Demographic details of the patients have been given in Table 1.

Associated injury was present in almost all cases. Diagnosis was made within 24 hr in 37% cases while it was delayed in 63% of cases. TDR was diagnosed in majority of cases (92.30%) with the help of X- ray with ryles tube *in situ* while 7.69% cases were confirmed by CECT as TDR cases.

Posterolateral thoracotomy was performed in all cases. Herniation of stomach and other abdominal viscera like spleen, liver, small intestine was also seen in 68%. Herniation of colon though rare was also seen in 2 cases. Postoperative pulmonary complications were seen in 18% cases. Postoperative mortality was 2.56%.

DISCUSSION

The dome shaped structure which separates thorax and abdomen is diaphragm. Apart from functioning in respiration, it also aids in emesis, urination, and preventing gastroesophageal reflux.⁷

TDH is usually missed at the time of first presentation.⁸ In our study TDR was mainly seen in males. Majority of patients diagnosed with left sided TDR (89.74%) which is in accordance with previously documented studies.⁹⁻¹¹

In our study oldest patient is of 60 years and youngest case was at the age of 12 years while in a study it ranged from 16 to 72 years.⁹

In our study major etiology was blunt traumatic injury which is in contradiction to other studies.⁵

In another published study by Gao J *et al.* 2015, penetrating wounds accounted for 59.4% with stab of 88.8% (135/152).⁴

The right hemidiaphragm is protected by the liver, hence the left hemidiaphragm is more prone to be ruptured because it is unprotected.^{5,12}

Dyspnoea and chest pain are the most common symptoms as documented by a study done by Peer SM 2009.¹

We could diagnose 37% of patients within 24 hr while 63% of patients were diagnosed after 24 hr while in a study 72% of patients were diagnosed within 24 hr.¹

TDR was diagnosed in 92.30% with the help of X- ray with ryles tube *in situ*. Similarly one study from the past also reported that Chest X-ray was diagnostic in 69% of the patients CT scan was required for diagnosis in 14% of patients.¹

In our study the most common organ to be herniated was stomach while rarest organ to be herniated was colon which is not supported by other published studies.^{5,13}

A previously done study documented that injuries associated with TDH were seen in 91% ($n=62$) of the patients and in our study we found associated injuries were present in almost all cases.¹⁴

We report that thoracotomy is an effective procedure for the treatment of TDH. Rent of the diaphragm was sutured with prolene mesh after reduction of the herniated content. Importance of thoracotomy in TDH was also supported by previous literature.¹⁵

Prompt diagnosis of TDH and its surgical management is mandatory. Traumatic diaphragmatic hernia should not undergo undiagnosed.¹⁶

CONCLUSION

TDH is a rare occurrence and its diagnosis is usually delayed. It should be diagnosed in time so that strangulation of the herniated organs is prevented. We found that X- ray is still a very important investigation which helps in diagnosis of TDH. The current pattern of

Table 1: Showing demographic details of the TDR cases.

Demographic parameter	Percentage of cases (%)
Males	74.35
Females	25.64
Left sided TDR	89.74
Right sided TDR	10.25
Blunt trauma to abdomen	76.92
Penetrating injury	10.25
Associated injuries	100
Post-operative mortality	2.56

TDH in Rajasthan has been highlighted to promote their prompt management.

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Contributions

All authors materially participated in the research. All participated in data collection, study design, and in article preparation. All authors participated in the conception and final discussion of the manuscript. All authors have approved the final article. Dhruva Sharma is the guarantor.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Research Quality and Ethics Statement

The authors of this manuscript declare that this scientific work complies with reporting quality, formatting and reproducibility guidelines set forth by the EQUATOR Network. The authors also attest that the Institutional Review Board/Ethics Committee approval was waived as this was a retrospective study. Permission from the Head of the Department, Cardiothoracic and Vascular Surgery, SMS Medical College and Attached Hospitals, Jaipur, India was taken prior to undertake this study.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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